Trend Study 4-13-01

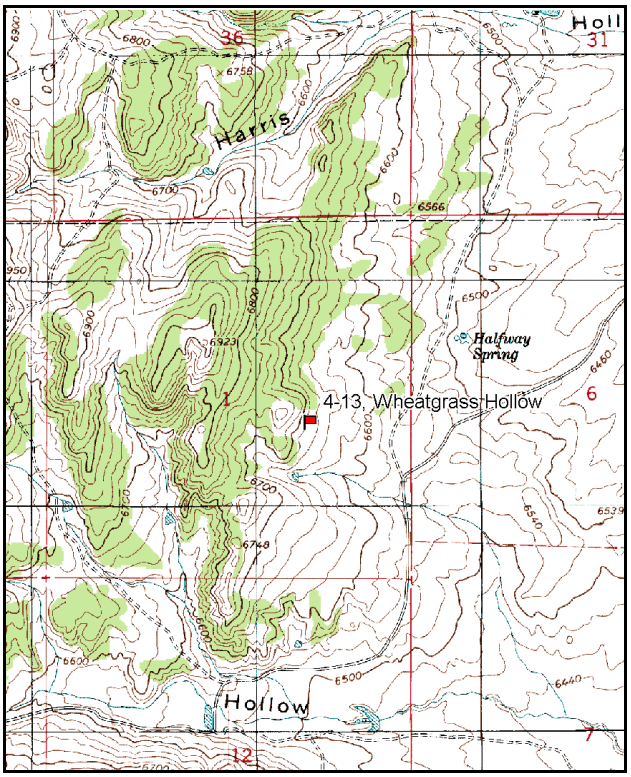
Study site name: Wheatgrass Hollow . Vegetation type: Big Sagebrush .

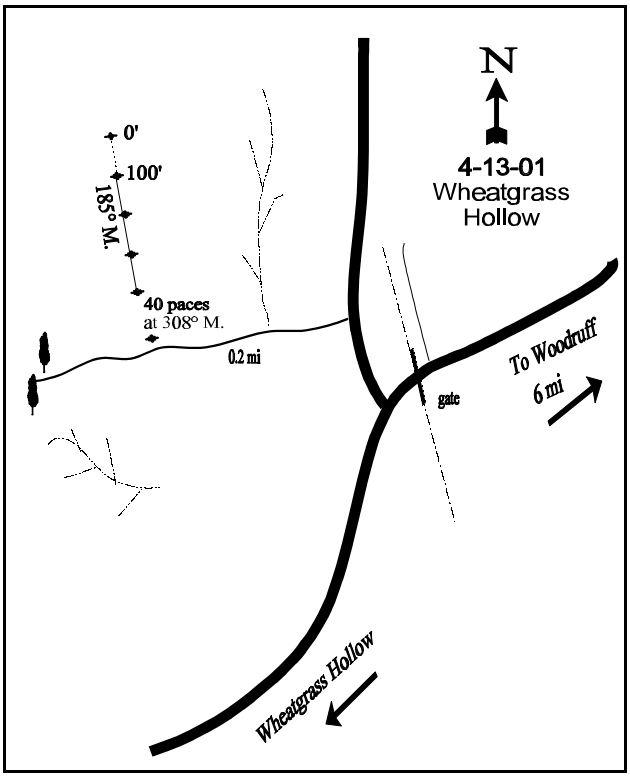
Compass bearing: frequency baseline 135 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Where Highway U-16 bends to the east on the south side of Woodruff, continue straight on Deseret Road (South Main). Go 2.5 miles and turn right (west) onto the Wheatgrass Road. Go 3.25 miles, crossing several cattleguards, to the fourth cattleguard. Continue past this cattleguard to a fork. Go north 0.05 miles to a fork with a faint road on the left. Go 0.2 miles west on the faint road to a witness post. From the witness post, walk 40 paces at 308 degrees magnetic to the 400-foot baseline stake. The 0-foot baseline stake is located 400 feet to the north at a bearing of 315 degrees magnetic.





Map Name: Neponset Reservoir NW

Diagrammatic Sketch

Township 8N , Range 6E , Section 1

UTM 4589340 N 482214 E

DISCUSSION

Trend Study No. 4-13

The Wheatgrass Hollow study was established in 1990. It samples BLM winter range in an area that is mostly private land. The range type is Wyoming big sagebrush with scattered juniper and pinyon and a sparse understory. The woodland is moderately dense on the ridge above the site. The site has a southeast aspect and 13% slope with an elevation of 6,650 feet. Deer use the area in most winters. Pellet group frequency was moderately high for deer in 1996, at 38%. Only a few elk pellet groups or cattle pats were encountered. A pellet group transect read on the site in 2001, estimated 58 deer days use/acre (144 ddu/ha). Only 1 elk pellet group was encountered. Most of the deer pellet groups appear to be from winter use.

The fine-textured soil is moderately shallow and compacted. Effective rooting depth is estimated at just over 10 inches. Soil texture is a sandy clay loam with a neutral soil reaction (pH 7.2). Phosphorus is marginal at only 10.3 ppm, where values of less than 10 ppm have been shown to limit plant growth and development. Pavement is a significant ground cover component. Other indicators of soil erosion include small shallow gullies and plant pedestalling. There is good ground cover under shrub crowns, but the shrub interspaces are largely bare. Due to the gentle terrain, erosion is not significant and the erosion condition class was determined to be stable in 2001.

Wyoming big sagebrush is the only abundant shrub on the site. It has a moderately high density with canopy cover averaging 23% in 1996 and 26% in 2001. Forage production per plant was low in 1990, partially due to the dense stand, but also to past heavy use and a high percentage of decadent plants. Also, 43% of the decadent sagebrush had reduced vigor due to insect damage. During the 1996 and 2001 readings, utilization of sagebrush has moderated. Vigor was normal on most plants and percent decadence has declined from 55% in 1990 to 23% in 2001. Recruitment is good with adequate numbers of seedlings and young plants to maintain the population.

A few shadscale, narrowleaf low rabbitbrush, greasewood, and prickly pear also occupy the site. Point-quarter data estimated the scattered junipers to have a density of 32 trees/acre in 1990, increasing to 47 trees/acre in 1996, and 58 trees/acre by 2001. Average diameter of juniper was 3.8 inches in 2001. Some of these trees have been heavily hedged (highlined) where available.

The native grass understory is comprised mainly of Sandberg bluegrass and bluebunch wheatgrass. Spring forb forage is lacking. The most numerous species consists of longleaf phlox and hoods phlox. Grasses and forbs combined produced only about 12% ground cover in 1996 and 2001.

1990 APPARENT TREND ASSESSMENT

The long-term vegetative trend for this site appears stable. The amount and diversity of forage produced is below optimum. The soil has previously suffered the effects of severe erosion, but currently it appears is relatively stable.

1996 TREND ASSESSMENT

The soil trend appears stable with similar amounts of protective ground cover compared to 1990. Trend for Wyoming big sagebrush is also stable. Density is slightly lower, but vigor has improved and percent decadency has declined from 55% to 25%. Trend for the herbaceous understory is stable but depleted. Nested frequency for bluebunch wheatgrass declined significantly. The sum of nested frequency for perennial grasses declined slightly overall, although sum of nested frequency for perennial forbs increased. Bluebunch

wheatgrass is more preferred but the decline probable does not warrant a declining trend designation for it only contributes 3% of the total grass cover.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable but depleted (3)

2001 TREND ASSESSMENT

Trend for soil is stable with similar amounts of protective ground cover compared to 1996. Percent cover of bare ground did increase but litter and vegetation cover also increased. There is little erosion currently occurring and the erosion condition class was determined as stable. Trend for Wyoming big sagebrush is up slightly. Utilization is mostly light to moderate. Density has increased 31%, vigor is normal on most plants, and percent decadence is relatively low at 23%. About 33% of the decadent plants were classified as dying, but young plants account for 23% of the population which is more than adequate to maintain the stand. Trend for the herbaceous understory is stable but depleted. All grasses and forbs combined produce only about 13% total cover. Sum of nested frequency for perennial grasses increased slightly, while that of perennial forbs declined slightly. Nested frequency of the more preferred bluebunch wheatgrass increased significantly. The forb composition is still very poor with hoods phlox and longleaf phlox providing 59% of the forb cover.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly (4)
herbaceous understory - stable but depleted (3)

HERBACEOUS TRENDS --
Herd unit 04 , Study no: 13

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'90	'96	'01	'90	'96	'01	'96	'01
G	Agropyron smithii	$_{a}$-	$_{a}$-	$_{b}$14	-	-	6	-	.08
G	Agropyron spicatum	$_{c}$71	$_{a}$15	$_{b}$47	35	8	19	.26	1.02
G	Bromus tectorum (a)	-	27	29	-	10	11	.05	.10
G	Carex spp.	1	-	-	1	-	-	-	-
G	Oryzopsis hymenoides	7	8	3	4	4	1	.22	.01
G	Poa secunda	$_{ab}$307	$_{b}$310	$_{a}$294	99	97	97	8.73	8.43
G	Sitanion hystrix	$_{a}$23	$_{b}$38	$_{a}$7	10	20	4	.39	.21
G	Stipa comata	$_{a}$16	$_{ab}$15	$_{b}$36	7	7	12	.54	.52
Total for Annual Grasses		0	27	29	0	10	11	0.05	0.10
Total for Perennial Grasses		425	386	401	156	136	139	10.15	10.28
Total for Grasses		425	413	430	156	146	150	10.21	10.39

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'90	'96	'01	'90	'96	'01	'96	'01
F	Agoseris glauca	-	1	-	-	1	-	.00	-
F	Antennaria rosea	17	24	32	7	12	15	.38	.20
F	Arabis spp.	4	3	-	2	1	-	.00	-
F	Astragalus convallarius	-	-	2	-	-	1	-	.03
F	Asclepias speciosa	-	4	-	-	1	-	.03	-
F	Astragalus spatulatus	$_{a}$-	$_{a}$5	$_{b}$14	-	3	10	.06	.07
F	Astragalus utahensis	-	3	3	-	1	1	.00	.00
F	Cordylanthus ramosus (a)	-	$_{a}$-	$_{b}$49	-	-	22	-	.59
F	Cryptantha spp.	-	1	-	-	1	-	.03	-
F	Erigeron pumilus	$_{b}$13	$_{ab}$10	$_{a}$6	9	4	2	.02	.01
F	Lappula occidentalis (a)	-	-	1	-	-	1	-	.00
F	Orobanche spp.	-	3	-	-	1	-	.00	-
F	Phlox hoodii	$_{a}$90	$_{b}$119	$_{ab}$114	40	51	47	1.39	1.26
F	Phlox longifolia	$_{b}$43	$_{b}$50	$_{a}$14	20	19	7	.12	.06
Total for Annual Forbs		0	0	50	0	0	23	0	0.59
Total for Perennial Forbs		167	223	185	78	95	83	2.05	1.64
Total for Forbs		167	223	235	78	95	106	2.05	2.24

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 04 , Study no: 13

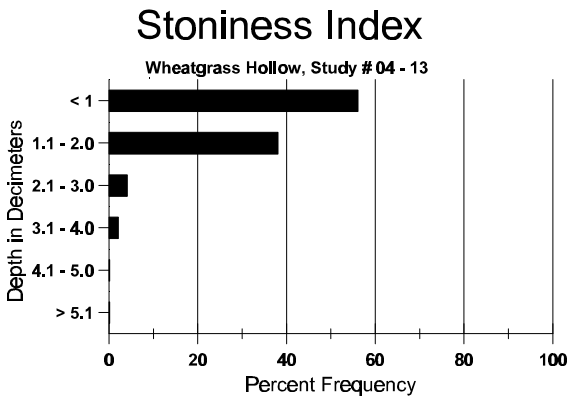
Type	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata wyomingensis	99	95	23.40	25.77
B	Atriplex confertifolia	3	2	-	.03
B	Chrysothamnus viscidiflorus viscidiflorus	15	10	.09	.33
B	Juniperus osteosperma	1	1	.00	-
B	Opuntia spp.	18	18	.04	.07
B	Sarcobatus vermiculatus	1	0	-	-
Total for Browse		137	126	23.54	26.20

BASIC COVER --
Herd unit 04 , Study no: 13

Cover Type	Nested Frequency		Average Cover %		
	'96	'01	'90	'96	'01
Vegetation	331	326	8.00	34.17	39.87
Rock	170	127	5.50	3.24	2.07
Pavement	300	309	27.00	17.76	18.94
Litter	382	348	34.50	25.90	27.56
Cryptogams	226	182	8.50	8.83	8.57
Bare Ground	296	269	16.50	15.49	26.14

SOIL ANALYSIS DATA --
Herd Unit 04, Study no: 13, Wheatgrass Hollow

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.4	58.6 (11.5)	7.2	49.0	22.0	29.0	4.5	10.3	204.8	.7



PELLET GROUP FREQUENCY --
Herd unit 04 , Study no: 13

Type	Quadrat Frequency		Pellet Transect	
	'96	'01	Pellet Groups per Acre ⁄01	Days Use per Acre (ha) ⁄01
Rabbit	10	3	26	N/A
Horse	-	1	17	N/A
Elk	4	4	9	1 (2)
Deer	38	20	757	58 (144)
Cattle	1	1	-	-

BROWSE CHARACTERISTICS --
Herd unit 04 , Study no: 13

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	90	2	-	-	2	-	-	-	-	-	4	-	-	-	266			4
	96	56	-	-	-	-	-	-	-	-	56	-	-	-	1120			56
	01	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
Y	90	21	2	1	1	-	-	-	-	-	23	2	-	-	1666			25
	96	23	8	-	1	-	-	-	-	-	32	-	-	-	640			32
	01	98	-	-	-	-	-	-	-	-	98	-	-	-	1960			98
M	90	11	5	3	1	-	-	-	-	-	13	1	6	-	1333	19	23	20
	96	57	117	14	-	4	-	-	-	-	190	2	-	-	3840	14	33	192
	01	137	80	15	-	-	1	-	-	-	233	-	-	-	4660	15	28	233
D	90	22	17	15	-	-	-	-	-	-	18	23	10	3	3600			54
	96	15	46	10	-	2	-	-	-	-	59	-	-	14	1460			73
	01	43	40	11	3	-	-	-	-	-	65	-	-	32	1940			97
X	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	1180			59
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	860			43

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'90	24%	19%	19%	-10%
'96	60%	08%	05%	+31%
'01	28%	06%	07%	

Total Plants/Acre (excluding Dead & Seedlings)				
'90	6599	Dec:		55%
'96	5940			25%
'01	8560			23%

Atriplex confertifolia																		
M	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60	11	10	3
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40	15	12	2
X	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'90	00%	00%	00%	
'96	00%	00%	00%	-33%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'90	0	Dec:	-
'96	60		-
'01	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus																		
M	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	35	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'90	00%	00%	00%
'96	00%	00%	00%
'01	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'90	0	Dec:	-
	'96	0		-
	'01	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
S	90	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	3	-	-	-	-	-	3	-	-	-	60			3
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	90	-	1	-	-	-	-	-	-	-	1	-	-	-	66	6	8	1
	96	17	-	-	-	-	-	-	-	-	17	-	-	-	340	10	16	17
	01	10	1	-	-	-	-	-	-	-	11	-	-	-	220	10	18	11
D	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	3	-	-	-	-	-	-	-	-	1	-	-	2	60			3
	01	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'90	100%	00%	00%
'96	00%	00%	09%
'01	14%	00%	00%

%Change

+86%

-39%

Total Plants/Acre (excluding Dead & Seedlings)				
	'90	66	Dec:	0%
	'96	460		13%
	'01	280		7%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
Y	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'90	00%	00%	00%	
'96	00%	00%	00%	+ 0%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'90	0	Dec:	-
	'96	20		-
	'01	20		-

Opuntia spp.																		
S	90	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	90	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	2	-	-	-	-	-	1	-	-	3	-	-	-	60			3
M	90	3	-	-	-	-	-	-	-	-	3	-	-	-	200	3	2	3
	96	27	-	-	-	-	-	-	-	-	27	-	-	-	540	4	13	27
	01	27	-	-	-	-	-	-	-	-	27	-	-	-	540	3	12	27
D	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	3	3	-	-	-	-	-	-	-	6	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'90	00%	00%	00%	+38%
'96	00%	00%	00%	+25%
'01	08%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'90	333	Dec:	0%
	'96	540		0%
	'01	720		17%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Sarcobatus vermiculatus																		
M	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	24	18	1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'90	00%	00%	00%
'96	00%	00%	00%
'01	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'90	0	Dec:	-
'96	20		-
'01	0		-